WHAT IS CLAIMED IS:

1. An acceleration sensor for detecting an acceleration caused by an object oscillated in an oscillation direction, comprising:

a sensor casing having a center axis and to be positioned in coaxial alignment with said oscillation direction to receive said acceleration, said sensor casing having first and second circular inner surfaces opposing to and spaced apart along said center axis from each other at a first space distance, and a third cylindrical inner surface connected at one end with said first inner surface and at the other end with said second inner surface to define a cylindrical closed space;

an oscillation plate accommodated in said closed space of said sensor casing and having a central portion securely supported by said sensor casing and a peripheral portion integrally formed with said central portion and extending radially outwardly of said central portion to be freely movable with respect to said sensor casing, said oscillation plate having a peripheral end surface spaced apart from said third inner surface of said sensor casing at an annular gap small enough to enable said oscillation plate to oscillate with respect to said sensor casing, said oscillation plate having a first flat surface opposing to and spaced apart along said center axis from said first inner surface of said sensor casing at a second space distance, and a second flat surface opposing to and spaced apart along said center axis from said second inner surface of said sensor casing at a third space distance, said oscillation plate being partly oscillatable along said center axis with respect to said sensor casing; and

a piezoelectric element having first and second surfaces and provided on at least one of said first and second flat surfaces of said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed; in which said first space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

2. An acceleration sensor as set forth in claim 1, in which said sensor casing has a supporting portion projecting from said first inner surface toward said second inner surface to support said oscillation plate, said piezoelectric element being provided on said second flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said second inner surface of said sensor casing at a fourth space distance, in which said second space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1, and in which said fourth space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

3. An acceleration sensor as set forth in claim 1, in which said sensor casing has a supporting portion projecting from said first inner surface toward said second inner surface to support said oscillation plate, said piezoelectric element being provided on said first flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said first inner surface of said sensor casing at a fifth space distance, in which said third space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1, and in which said fifth space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

4. An acceleration sensor as set forth in claim 1, in which said sensor casing has a supporting portion projecting from said second inner surface toward said first inner surface to support said oscillation plate, said piezoelectric element being provided on said first flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said first inner surface of said sensor casing at a sixth space distance, in which said third space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1, and in which said sixth space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

5. An acceleration sensor as set forth in claim 1, in which said sensor casing has a supporting portion projecting from said second inner surface toward said first inner surface to support said oscillation plate, said piezoelectric element being provided on said second flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said second inner surface of said sensor casing at a seventh space distance, in which said second space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1, and in which said seventh space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

6. An acceleration sensor for detecting an acceleration caused by an object oscillated in an oscillation direction, comprising:

a sensor casing having a center axis and to be positioned in coaxial alignment with said oscillation direction to receive said acceleration, said sensor casing having first and second circular inner surfaces opposing to and spaced apart along said center axis from each other at a first space distance, and a third cylindrical inner surface connected at one end with said first inner surface and at the other end with said second inner surface to define a cylindrical closed space;

an oscillation plate accommodated in said closed space of said sensor casing and

having a central portion securely supported by said sensor casing and a peripheral portion integrally formed with said central portion and extending radially outwardly of said central portion to be freely movable with respect to said sensor casing, said oscillation plate having a peripheral end surface spaced apart from said third inner surface of said sensor casing at an annular gap small enough to enable said oscillation plate to oscillate with respect to said sensor casing, said oscillation plate having a first flat surface opposing to and spaced apart along said center axis from said first inner surface of said sensor casing at a second space distance, and a second flat surface opposing to and spaced apart along said center axis from said second inner surface of said sensor casing at a third space distance, said oscillation plate being partly oscillatable along said center axis with respect to said sensor casing;

a first piezoelectric element having first and second surfaces and provided on said first flat surface of said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed; and

a second piezoelectric element having first and second surfaces and provided on said second flat surface of said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed; in which said first space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

7. An acceleration sensor as set forth in claim 6, in which said sensor casing has a supporting portion projecting from said first inner surface toward said second inner surface to support said oscillation plate, said first piezoelectric element being provided on said first flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said first inner surface of said sensor casing at a fourth space distance, said second piezoelectric element being provided on said second flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said second inner surface of said sensor casing at a fifth space distance, in which said fourth space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1, and in which said fifth space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

8. An acceleration sensor as set forth in claim 6, in which said sensor casing has a supporting portion projecting from said second inner surface toward said first inner surface to

support said oscillation plate, said first piezoelectric element being provided on said first flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said first inner surface of said sensor casing at a sixth space distance, and said second piezoelectric element being provided on said second flat surface of said oscillation plate and opposing to and spaced apart along said center axis from said second inner surface of said sensor casing at a seventh space distance, in which said sixth space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1, and in which said seventh space distance is less than or equal to the diameter of said third inner surface of said sensor casing multiplied by 0.1.

9. An acceleration sensor for detecting an acceleration caused by an object oscillated in an oscillation direction, comprising:

a sensor casing having a center axis and to be positioned in coaxial alignment with said oscillation direction to receive said acceleration, said sensor casing including a cylindrical fixed case member having a circular bottom portion having a first circular inner surface, a cylindrical side portion integrally formed with said bottom portion, and a supporting portion projecting from said bottom portion, and a cover member being provided on said fixed case member and having a circular cover portion having a second circular inner surface, and a cylindrical side portion integrally formed with said cover portion, said side portion of said fixed case member having a third cylindrical inner surface connected at one end with said first inner surface, said side portion of said cover member having a fourth cylindrical inner surface connected at one end with said second inner surface, said second inner surface of said cover portion of said cover member opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a first space distance, said first inner surface of said bottom portion of said fixed case member and said third inner surface of said side portion of said fixed case member, and said second inner surface of said cover portion of said cover member and said fourth inner surface of said side portion of said cover member collectively defining a cylindrical closed space;

an oscillation plate accommodated in said closed space of said sensor casing and having a central portion securely supported by said supporting portion of said fixed case member of said sensor casing, and a peripheral portion integrally formed with said central portion and extending radially outwardly of said central portion to be freely movable with respect to said sensor casing, said oscillation plate having a peripheral end surface spaced apart from said third inner surface of said side portion of said fixed case member at an annular gap small enough to enable said oscillation plate to oscillate with respect to said sensor casing, said oscillation plate having a first flat surface opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a second

space distance, and a second flat surface opposing to and spaced apart along said center axis from said second inner surface of said cover portion of said cover member at a third space distance, said oscillation plate being partly oscillatable along said center axis with respect to said sensor casing; and

a piezoelectric element having a first surface held in contact with said second flat surface of said oscillation plate, and a second surface opposing to and spaced apart along said center axis from said second inner surface of said cover portion of said cover member at a fourth space distance, said piezoelectric element being provided on said second flat surface of said oscillation plate in axial alignment with said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed; in which said first space distance is less than or equal to the diameter of said third inner surface of said side portion of said fixed case member multiplied by 0.1, and in which said first space distance is less than or equal to the diameter of said fourth inner surface of said side portion of said cover member multiplied by 0.1.

10. An acceleration sensor as set forth in claim 9, in which said second space distance is less than or equal to the diameter of said third inner surface of said side portion of said fixed case member multiplied by 0.1, and in which said fourth space distance is less than or equal to the diameter of said third inner surface of said side portion of said fixed case member multiplied by 0.1.

11. An acceleration sensor as set forth in claim 9, in which said second space distance is less than or equal to the diameter of said fourth inner surface of said side portion of said cover member multiplied by 0.1, and in which said fourth space distance is less than or equal to the diameter of said fourth inner surface of said side portion of said cover member multiplied by 0.1.

12. An acceleration sensor as set forth in claim 9, in which said piezoelectric element is in the form of an annular shape and has said first surface held in contact with said second flat surface of said oscillation plate and having thereon a first electrode between said first surface of said piezoelectric element and said second flat surface of said oscillation plate, and said second surface opposing to said second inner surface of said cover portion of said cover member and having thereon a second electrode opposing to said second inner surface of said cover portion of said cover member, and in which said first and second electrodes enable said voltage indicative of said acceleration to output therethrough.

13. An acceleration sensor as set forth in claim 9, in which said fixed case member is made of a metal, and said cover member is made of a plastic.

14. An acceleration sensor as set forth in claim 9, in which said side portion of said fixed case member has a first section close to said bottom portion of said fixed case member, a second section remote from said bottom portion of said fixed case member, and an annular ledge section formed between said first and second sections with an annular groove open toward said side portion of said cover member, in which the diameter of said first section of said side portion of said fixed case member is smaller than or equal to the diameter of said side portion of said cover member, and in which said side portion of said cover member is snugly received in said annular groove with a resilient ring intervening between said annular ledge section of said side portion of said fixed case member and said side portion of said cover member to hermetically seal the gap between said annular ledge section of said side portion of said fixed case member and said side portion of said cover member.

15. An acceleration sensor as set forth in claim 9, which further comprises an output terminal pin mounted on said cover member and extending into said closed space to be electrically connected to said piezoelectric element, in which said output terminal pin has a terminal end portion projecting outwardly of said cover member and electrically connectable with an exterior coupling member to output said voltage indicative of said acceleration.

16. An acceleration sensor as set forth in claim 9, in which said fixed case member has a screw portion to be screwed to said object which is to receive said acceleration.

17. An acceleration sensor as set forth in claim 9, in which said supporting portion of said fixed case member projects toward said cover portion of said cover member and is tapered toward said oscillation plate.

18. An acceleration sensor for detecting an acceleration caused by an object oscillated in an oscillation direction, comprising:

a sensor casing having a center axis and to be positioned in coaxial alignment with said oscillation direction to receive said acceleration, said sensor casing including a cylindrical fixed case member having a circular bottom portion having a first circular inner surface, and a cylindrical side portion integrally formed with said bottom portion, said side portion of said fixed case member having a first section close to said bottom portion of said fixed case member, a second section remote from said bottom portion of said fixed case

member and radially inwardly bent, and an annular ledge section formed between said first and second sections with an annular ledge, a metal base member having a circular base portion and a supporting portion, said base portion having a second circular inner surface and a circular outer surface, and said supporting portion projecting from said second inner surface, said base portion of said metal base member having a central section integrally formed with said supporting portion, and a peripheral section extending radially outwardly of said central section, said metal base member mounted on said annular ledge of said fixed case member with a resilient ring intervening between said second section of said side portion of said fixed case member and said peripheral section of said base portion of said metal base member to hermetically seal the gap between said second section of said side portion of said fixed case member and said peripheral section of said base portion of said metal base member, said first section of said side portion of said fixed case member having a third cylindrical inner surface connected at one end with said first inner surface of said bottom portion of said fixed case member and at the other end with said second inner surface of said base portion of said metal base member, said second inner surface of said base portion of said metal base member opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a first space distance, and a cover member being provided on said outer surface of said metal base member and having a peripheral section firmly engaged with said second section of said side portion of said fixed case member, said first inner surface of said bottom portion of said fixed case member, said second inner surface of said base portion of said metal base member, and said third inner surface of said first section of said side portion of said fixed case member collectively defining a cylindrical closed space;

an oscillation plate accommodated in said closed space of said sensor casing and having a central portion securely supported by said supporting portion of said metal base member of said sensor casing, and a peripheral portion integrally formed with said central portion and extending radially outwardly of said central portion to be freely movable with respect to said sensor casing, said oscillation plate having a peripheral end surface spaced apart from said third inner surface of said first section of said side portion of said fixed case member at an annular gap small enough to enable said oscillation plate to oscillate with respect to said sensor casing, said oscillation plate having a first flat surface opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a second space distance, and a second flat surface opposing to and spaced apart along said center axis from said second inner surface of said base portion of said metal base member at a third space distance, said oscillation plate being partly oscillatable along said center axis with respect to said sensor casing; and

a piezoelectric element having a first surface opposing to and spaced apart along said

center axis from said first inner surface of said bottom portion of said fixed case member at a fourth space distance, and a second surface held in contact with said first flat surface of said oscillation plate, said piezoelectric element being provided on said first flat surface of said oscillation plate in axial alignment with said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed; in which said first space distance is less than or equal to the diameter of said third inner surface of said first section of said side portion of said fixed case member multiplied by 0.1.

19. An acceleration sensor as set forth in claim 18, in which said third space distance is less than or equal to the diameter of said third inner surface of said first section of said side portion of said fixed case member multiplied by 0.1, and in which said fourth space distance is less than or equal to the diameter of said third inner surface of said first section of said side portion of said fixed case member multiplied by 0.1.

20. An acceleration sensor as set forth in claim 18, in which said piezoelectric element is in the form of an annular shape and has said first surface opposing to said first inner surface of said bottom portion of said fixed case member and having thereon a first electrode opposing to said first inner surface of said bottom portion of said fixed case member, and said second surface held in contact with said first flat surface of said oscillation plate and having thereon a second electrode between said second surface of said piezoelectric element and said first flat surface of said oscillation plate, in which said first and second electrodes enable said voltage indicative of said acceleration to output therethrough.

21. An acceleration sensor as set forth in claim 18, in which said fixed case member and said metal base member are made of a metal, and said cover member is made of a plastic.

22. An acceleration sensor as set forth in claim 18, which further comprises an output terminal pin mounted on said cover member and partly extending through said cover member, said supporting portion of said metal base member, said oscillation plate, and said piezoelectric element into said closed space to be electrically connected to said piezoelectric element, in which said output terminal pin has a terminal end portion projecting outwardly of said cover member and electrically connectable with an exterior coupling member to output said voltage indicative of said acceleration.

23. An acceleration sensor as set forth in claim 18, in which said fixed case member has

a screw portion to be screwed to said object which is to receive said acceleration.

24. An acceleration sensor as set forth in claim 18, in which said supporting portion of said metal base member projects toward said bottom portion of said fixed case member and is tapered toward said oscillation plate and formed with a through bore.

25. An acceleration sensor as set forth in claim 18, which further comprises a resilient metal plate in the form of a truncated cone shape and having an open end electrically connectable with said piezoelectric element.

26. An acceleration sensor as set forth in claim 25, in which said bottom portion of said fixed case member is formed with a central cavity plate open toward said metal plate and in the form similar to said shape of said metal plate.

27. An acceleration sensor as set forth in claim 18, in which said oscillation plate has a central hole formed at the center portion thereof and open at said first and second flat surfaces, in which said piezoelectric element has a central hole formed at the center portion thereof and open at its first and second surfaces.

28. An acceleration sensor for detecting an acceleration caused by an object oscillated in an oscillation direction, comprising:

a sensor casing having a center axis and to be positioned in coaxial alignment with said oscillation direction to receive said acceleration, said sensor casing including a cylindrical fixed case member having a circular bottom portion having a first circular inner surface, and a cylindrical side portion integrally formed with said bottom portion, said side portion of said fixed case member having a first section close to said bottom portion of said fixed case member, a second section remote from said bottom portion of said fixed case member and radially inwardly bent, and an annular ledge section formed between said first and second sections with an annular ledge, a metal base member having a circular base portion and a supporting portion, said base portion having a second circular inner surface and a circular outer surface, and said supporting portion projecting from said second inner surface, said base portion of said metal base member having a central section integrally formed with said supporting portion, and a peripheral section extending radially outwardly of said central section, said metal base member mounted on said annular ledge of said fixed case member with a resilient ring intervening between said second section of said side portion of said fixed case member and said peripheral section of said base portion of said metal base member to hermetically seal the gap between said second section of said side portion of said fixed case

member and said peripheral section of said base portion of said metal base member, said first section of said side portion of said fixed case member having a third cylindrical inner surface connected at one end with said first inner surface of said bottom portion of said fixed case member and at the other end with said second inner surface of said base portion of said metal base member, said second inner surface of said base portion of said metal base member opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a first space distance, and a cover member being provided on said outer surface of said metal base member and having a peripheral section firmly engaged with said second section of said side portion of said fixed case member, said first inner surface of said bottom portion of said fixed case member, said second inner surface of said base portion of said metal base member, and said third inner surface of said first section of said side portion of said fixed case member collectively defining a cylindrical closed space;

an oscillation plate accommodated in said closed space of said sensor casing and having a central portion securely supported by said supporting portion of said metal base member of said sensor casing, and a peripheral portion integrally formed with said central portion and extending radially outwardly of said central portion to be freely movable with respect to said sensor casing, said oscillation plate having a peripheral end surface spaced apart from said third inner surface of said first section of said side portion of said fixed case member at an annular gap small enough to enable said oscillation plate to oscillate with respect to said sensor casing, said oscillation plate having a first flat surface opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a second space distance, and a second flat surface opposing to and spaced apart along said center axis from said second inner surface of said base portion of said metal base member at a third space distance, said oscillation plate being partly oscillatable along said center axis with respect to said sensor casing; and

a piezoelectric element having first and second surfaces and provided on at least one of said first and second flat surfaces of said oscillation plate in axial alignment with said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed, said oscillation plate and said piezoelectric element collectively constituting an oscillation body; in which the resonance frequency of said sensor casing is more than or equal to the resonance frequency of said oscillation body multiplied by 3, and in which the modulus of elasticity in bending of said cover member is more than or equal to 8×10^3 (MPa), and the logarithmic decrement of said cover member is more than or equal to 8 (1/s).

29. An acceleration sensor as set forth in claim 28, in which said fixed case member and said metal base member are made of a metal, and said cover member is made of a polymer liquid crystal.

30. An acceleration sensor as set forth in claim 28, said metal base member having a circumferential section firmly connected to said annular ledge section of said side portion of said fixed case member, in which the diameter of said circumferential section of said metal base member is less than or equal to the diameter of said oscillation plate multiplied by 1.4, and the thickness of said metal base member is more than or equal to the thickness of said oscillation plate multiplied by 6.

31. An acceleration sensor as set forth in claim 28, in which said piezoelectric element is in the form of an annular shape and provided on said first flat surface of said oscillation plate, and said piezoelectric element has said first surface opposing to said first inner surface of said bottom portion of said fixed case member and having thereon a first electrode opposing to said first inner surface of said bottom portion of said fixed case member, and said second surface held in contact with said first flat surface of said oscillation plate and having thereon a second electrode between said second surface of said piezoelectric element and said first flat surface of said oscillation plate, in which said first and second electrodes enable said voltage indicative of said acceleration to output therethrough.

32. An acceleration sensor as set forth in claim 28, in which said piezoelectric element is in the form of an annular shape and provided on said second flat surface of said oscillation plate, and said piezoelectric element has said first surface held in contact with said second flat surface of said oscillation plate and having thereon a first electrode between said first surface of said piezoelectric element and said second flat surface of said oscillation plate, and said second surface opposing to said second inner surface of said base portion of said metal base member and having thereon a second electrode opposing to said second inner surface of said base portion of said metal base member, in which said first and second electrodes enable said voltage indicative of said acceleration to output therethrough.

33. An acceleration sensor as set forth in claim 28, which further comprises an output terminal pin mounted on said cover member and partly extending through said cover member, said supporting portion of said metal base member, said oscillation plate, and said piezoelectric element into said closed space to be electrically connected to said piezoelectric element, in which said output terminal pin has a terminal end portion projecting outwardly of said cover member and electrically connectable with an exterior coupling member to output

said voltage indicative of said acceleration.

34. An acceleration sensor as set forth in claim 28, in which said fixed case member has a screw portion to be screwed to said object which is to receive said acceleration.

35. An acceleration sensor as set forth in claim 28, in which said supporting portion of said metal base member projects toward said bottom portion of said fixed case member and is tapered toward said oscillation plate and formed with a through bore.

36. An acceleration sensor as set forth in claim 28, which further comprises a resilient metal plate in the form of a truncated cone shape and having an open end electrically connectable with said piezoelectric element.

37. An acceleration sensor as set forth in claim 36, in which said bottom portion of said fixed case member is formed with a central cavity plate open toward said metal plate and in the form similar to said shape of said metal plate.

38. An acceleration sensor as set forth in claim 28, in which said oscillation plate has a central hole formed at the center portion thereof and open at said first and second flat surfaces, in which said piezoelectric element has a central hole formed at the center portion thereof and open at its first and second surfaces.

39. An acceleration sensor for detecting an acceleration caused by an object oscillated in an oscillation direction, comprising:

a sensor casing having a center axis and to be positioned in coaxial alignment with said oscillation direction to receive said acceleration, said sensor casing including a cylindrical fixed case member having a circular bottom portion having a first circular inner surface, and a cylindrical side portion integrally formed with said bottom portion, said side portion of said fixed case member having a first section close to said bottom portion of said fixed case member, a second section remote from said bottom portion of said fixed case member and radially inwardly bent, and an annular ledge section formed between said first and second sections with an annular ledge, a metal base member having a circular base portion and a supporting portion, said base portion having a second circular inner surface and a circular outer surface, and said supporting portion projecting from said second inner surface, said base portion of said metal base member having a central section integrally formed with said supporting portion, and a peripheral section extending radially outwardly of said central section, said metal base member mounted on said annular ledge of said fixed case member

with a resilient ring intervening between said second section of said side portion of said fixed case member and said peripheral section of said base portion of said metal base member to hermetically seal the gap between said second section of said side portion of said fixed case member and said peripheral section of said base portion of said metal base member, said first section of said side portion of said fixed case member having a third cylindrical inner surface connected at one end with said first inner surface of said bottom portion of said fixed case member and at the other end with said second inner surface of said base portion of said metal base member, said second inner surface of said base portion of said metal base member opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a first space distance, and a cover member being provided on said outer surface of said metal base member and having a peripheral section firmly engaged with said second section of said side portion of said fixed case member, said first inner surface of said bottom portion of said fixed case member, said second inner surface of said base portion of said metal base member, and said third inner surface of said first section of said side portion of said fixed case member collectively defining a cylindrical closed space;

an oscillation plate accommodated in said closed space of said sensor casing and having a central portion securely supported by said supporting portion of said metal base member of said sensor casing, and a peripheral portion integrally formed with said central portion and extending radially outwardly of said central portion to be freely movable with respect to said sensor casing, said oscillation plate having a peripheral end surface spaced apart from said third inner surface of said first section of said side portion of said fixed case member at an annular gap small enough to enable said oscillation plate to oscillate with respect to said sensor casing, said oscillation plate having a first flat surface opposing to and spaced apart along said center axis from said first inner surface of said bottom portion of said fixed case member at a second space distance, and a second flat surface opposing to and spaced apart along said center axis from said second inner surface of said base portion of said metal base member at a third space distance, said oscillation plate being partly oscillatable along said center axis with respect to said sensor casing;

a first piezoelectric element having first and second surfaces and provided on said first flat surface of said oscillation plate in axial alignment with said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed; and

a second piezoelectric element having first and second surfaces and provided on said second flat surface of said oscillation plate in axial alignment with said oscillation plate to generate a voltage indicative of said acceleration when said acceleration is exerted on said

sensor casing to have said oscillation plate partly oscillated along said center axis with respect to said sensor casing with said peripheral portion of said oscillation plate being deformed, said oscillation plate and said first and second piezoelectric elements collectively constituting an oscillation body; in which the resonance frequency of said sensor casing is more than or equal to the resonance frequency of said oscillation body multiplied by 3, and in which the modulus of elasticity in bending of said cover member is more than or equal to 8×10^3 (MPa), and the logarithmic decrement of said cover member is more than or equal to 8 (1/s).

40. An acceleration sensor as set forth in claim 39, in which said fixed case member and said metal base member are made of a metal, and said cover member is made of a polymer liquid crystal.

41. An acceleration sensor as set forth in claim 39, said metal base member having a circumferential section firmly connected to said annular ledge section of said side portion of said fixed case member, in which the diameter of said circumferential section of said metal base member is less than or equal to the diameter of said oscillation plate multiplied by 1.4, and the thickness of said metal base member is more than or equal to the thickness of said oscillation plate multiplied by 6.

42. An acceleration sensor as set forth in claim 39, in which said first piezoelectric element is in the form of an annular shape and provided on said first flat surface of said oscillation plate, and said first piezoelectric element has said first surface opposing to said first inner surface of said bottom portion of said fixed case member and having thereon a first electrode opposing to said first inner surface of said bottom portion of said fixed case member, and said second surface held in contact with said first flat surface of said oscillation plate and having thereon a second electrode between said second surface of said first piezoelectric element and said first flat surface of said oscillation plate, in which said first and second electrodes of said first piezoelectric element enable said voltage indicative of said acceleration to output therethrough, in which said second piezoelectric element is in the form of an annular shape and provided on said second flat surface of said oscillation plate, and said second piezoelectric element has said first surface held in contact with said second flat surface of said oscillation plate and having thereon a first electrode between said first surface of said second piezoelectric element and said second flat surface of said oscillation plate, and said second surface opposing to said second inner surface of said base portion of said metal base member and having thereon a second electrode opposing to said second inner surface of said base portion of said metal base member, in which said first and second electrodes of said second piezoelectric element enable said voltage indicative of said acceleration to output

therethrough.

43. An acceleration sensor as set forth in claim 39, which further comprises an output terminal pin mounted on said cover member and partly extending through said cover member, said supporting portion of said metal base member, said oscillation plate, and said piezoelectric element into said closed space to be electrically connected to said piezoelectric element, in which said output terminal pin has a terminal end portion projecting outwardly of said cover member and electrically connectable with an exterior coupling member to output said voltage indicative of said acceleration.

44. An acceleration sensor as set forth in claim 39, in which said fixed case member has a screw portion to be screwed to said object which is to receive said acceleration.

45. An acceleration sensor as set forth in claim 39, in which said supporting portion of said metal base member projects toward said bottom portion of said fixed case member and is tapered toward said oscillation plate and formed with a through bore.

46. An acceleration sensor as set forth in claim 39, which further comprises a resilient metal plate in the form of a truncated cone shape and having an open end electrically connectable with said first piezoelectric element.

47. An acceleration sensor as set forth in claim 46, in which said bottom portion of said fixed case member is formed with a central cavity plate open toward said metal plate and in the form similar to said shape of said metal plate.

48. An acceleration sensor as set forth in claim 39, in which said oscillation plate has a central hole formed at the center portion thereof and open at said first and second flat surfaces, in which said first piezoelectric element has a central hole formed at the center portion thereof and open at its first and second surfaces, in which said second piezoelectric element has a central hole formed at the center portion thereof and open at its first and second surfaces.